

**FY 1998
Higher Education
Challenge Grants**

**Descriptions of
Funded Projects**

**Higher Education Programs
Science and Education Resources Development
Cooperative State Research, Education, and Extension Service
U.S. Department of Agriculture
Washington, D.C.**

FY 1998 HIGHER EDUCATION CHALLENGE GRANTS PROGRAM

The Higher Education Challenge Grants Program, administered by the USDA Office of Higher Education Programs, is designed to stimulate and enable colleges and universities to provide the quality of education necessary to produce graduates capable of strengthening the Nation's food and agricultural scientific and professional work force. It is intended that projects supported by the program will: (1) address a regional, State, national, or international educational need; (2) involve a creative or novel approach toward addressing the need which can serve as a model to others; (3) encourage and facilitate better working relationships in the university science and education community, as well as between universities and the private sector, to enhance program quality and supplement available resources; and (4) result in benefits which will likely transcend the project duration and USDA support.

Proposals may be submitted by all U.S. colleges and universities that have a demonstrable capacity to carry out teaching in the food and agricultural sciences at the baccalaureate and first professional degree levels. Each grantee must have a significant ongoing commitment to the food and agricultural sciences and to the specific subject areas for which such a grant is used. Generally, the food and agricultural sciences consist of agriculture, natural resources, forestry, family and consumer sciences, veterinary medicine, and closely allied disciplines.

In FY 1998, \$4,039,822 were available to support projects which addressed the undergraduate or first professional level of study in the following targeted areas: (1) curricula design and materials development; (2) faculty preparation and enhancement for teaching; (3) instruction delivery systems; and (4) student experiential learning.

A total of 71 different institutions from 45 States submitted 164 proposals for consideration for funding in the ninth year of the program. In May 1998, the grant applications were evaluated by a 38-member peer review panel. The panel was comprised of faculty members of land-grant and nonland-grant institutions or with a joint appointment at ARS laboratories. Panelists represented various academic areas including business, agriculture, natural resources, forestry, veterinary medicine, family and consumer sciences, and closely allied disciplines. Funds were available to support a total of 44 grants based on the peer review deliberations. The 44 grants were awarded to 33 lead institutions in 29 States. Twelve of the projects funded in FY 1998 were joint projects involving three or four institutions. When the collaborating institutions are included with the lead institutions, a total of 40 institutions from 31 States, one military academy, and one U.S. territory are being supported under the FY 1998 Higher Education Challenge Grants Program.

Brief descriptions of the successful FY 1998 projects are included in this document. Details can be obtained from the project directors.

1998 Challenge Grant Description Sheet

Grant Number	Institution	Project Director	Project Duration	Funds Awarded
98-38411-6789	Auburn University	Mulvaney	2 yrs	\$146,746
98-38411-6613	University of Arizona	Matter	1.5 yrs	70,046
98-38411-6610	University of Arkansas	Emmert	3 yrs	78,281
98-38411-6698	University of Arkansas	Wardlow	3 yrs	160,000
98-38411-6724	California State University - Fresno	Dickerson	2 yrs	78,288
98-38411-6567	California Polytechnic State University	Heiss	2 yrs	159,917
98-38411-6623	University of Florida	Buszko	2 yrs	76,000
98-38411-6726	University of Florida	Crane	1.5 yrs	80,000
98-38411-6727	University of Georgia	McHugh	3 yrs	79,736
98-38411-6563	Southern Illinois University	Anderson	1.5 yrs	79,433
98-38411-6612	Purdue University	Stitsworth	2 yrs	79,977
98-38411-6565	Iowa State University	Jungst	2.5 yrs	73,235
98-38411-6561	Kansas State University	Schurle	3 yrs	74,678
98-38411-6725	Kansas State University	Munson	2 yrs	71,758
98-38411-6697	Kansas State University	Williams	2 yrs	70,988
98-38411-6564	Louisiana State University	Summers	3 yrs	159,983
98-38411-6618	University of Maine	Rice	3 yrs	68,009
98-38411-6611	University of Maryland	Dahl	2 yrs	79,811
98-38411-6696	Michigan State University	Boyd	2 yrs	152,800
98-38411-6614	Michigan State University	Sawyer	1.5 yrs	142,045
98-38411-6622	University of Minnesota	Nater	2 yrs	159,963
98-38411-6562	Southeast Missouri State University	Ford	3 yrs	14,520
98-38411-6566	Rutgers University	Gianfagna	2 yrs	159,316
98-38411-6621	Rutgers University	Zilinskas	3 yrs	75,671
98-38411-6729	East Carolina University	Gallagher	2 yrs	80,000
98-38411-6624	New Mexico State University	Clary	2 yrs	80,000
98-38411-6576	Cornell University	McClintock	2 yrs	79,860
98-38411-6574	Cornell University	Oltenacu	2 yrs	64,833
98-38411-6577	Ohio State University	Earnest	3 yrs	79,617
98-38411-6575	Oklahoma State University	Kuzmic	2 yrs	40,165
98-38411-6802	Oklahoma State University	Ownbey	2 yrs	78,772
98-38411-6620	Pennsylvania State University	Irudayaraj	2 yrs	80,000
98-38411-6695	Pennsylvania State University	Griel	2 yrs	71,741
98-38411-6617	University of Rhode Island	Grossman-Garber	2 yrs	80,000
98-38411-6625	South Dakota State University	Nichols	3 yrs	79,500
98-38411-6699	University of Tennessee	Schultze	3 yrs	157,041
98-38411-6619	Texas A&M University - Kingsville	Patil	3 yrs	79,945
98-38411-6615	Texas Tech University	Felstehausen	3 yrs	160,000
98-38411-6754	Virginia Polytechnic Institute	McKenna	2 yrs	159,700
98-38411-6572	Virginia Polytechnic Institute	Reaves	3 yrs	43,793
98-38411-6573	Virginia Polytechnic Institute	Welbaum	2 yrs	15,173
98-38411-6616	Washington State University	Hines	3 yrs	80,000
98-38411-6568	University of Wisconsin	Parkin	3 yrs	80,000
98-38411-6788	University of Wisconsin - Platteville	Compton	2 yrs	58,481
Total				\$4,039,822

Grant Number: 98-38411-6789
Project Director: Donald Mulvaney

Lead Institution: Auburn University
Duration: 2 Years Award Amount \$146,746

Title: Partners for Social Change: Developing Leadership in Agricultural Students. Auburn University, Alabama A&M University and the Tuskegee University have formed a partnership between their faculty and students to develop a leadership development course based on a social change model for Leadership Development. The objectives of this project are: 1) to develop a leadership course for undergraduate agricultural students that responds to the needs of the agricultural students and that responds to the needs of the agricultural industry and the state of Alabama by educating students to become effective leadership practitioners and advocates for improving the quality of life for their communities and state, 2) to establish a long standing partnership among universities for an agricultural education conference, and 3) to publish the results in a peer reviewed agricultural education journal. Faculty and students will work collaboratively to develop a leadership conference for agricultural students at these institutions.

Grant Number: 98-38411-6613
Project Director: William Matter

Lead Institution: University of Arizona
Duration: 1.5 Years Award Amount \$70,046

Title: Integrated Learning in a Core Curriculum in Renewable Natural Resources. Traditional collections of foundation and discipline-specific courses do not prepare students adequately for the multi-disciplinary nature of natural resources management. The School of Renewable Natural Resources at the University of Arizona has developed and implemented a core curriculum of 9 courses shared by students majoring in range, watershed, wildlife, and fisheries management. However, a shared curriculum requires that faculty agree on learning objectives and outcomes, minimize redundancy, work to reinforce learning, and remain open to adjusting course content and format to meet expectations of fellow faculty and students. Such openness, and mechanisms for its expression are virtually unknown to the highly autonomous faculty of universities. This has hindered achievement of the objectives of the core curriculum of the School, and will be a barrier to success for any shared core curriculum in natural resources at any university. We hope to make the core curriculum process at the University of Arizona a model for other colleges and universities. Specifically, we propose to design and pilot mechanisms for faculty to refine and implement changes to our core curriculum. A series of workshops will help faculty define shared educational goals, translate goals into specific learning objectives, and integrate objectives and their placement across core courses to achieve repeated reinforcement of learning and sequential mastery of skills. A new educational software will be used to help faculty in this process. Some key objectives will be operationalized by designing and piloting, with faculty, integrated computer-based learning activities. We will evaluate the project by assessing faculty perceptions and knowledge before and after the planning process, and by assessing student outcomes with and without the influence of computer-based learning activities. Our findings will be presented: 1) at the Biennial Conference on University Education in Natural Resources, 2) on the College of Agriculture web site and 3.) through our partnerships with Pima Community College and other institutions with natural resource programs and 4) the dissertation of a PhD student who will work on this project .

Grant Number: 98-38411-6610
Project Director: Jason Emmert

Lead Institution: University of Arkansas
Duration: 3 Years Award Amount \$78,281

Title: Development of a Computer/Internet-Based Poultry Science Curriculum. This University of Arkansas project proposes to develop a Poultry Science curriculum based on computer-mediated instructional technology. Our overall goal is to develop a computer-based poultry science curriculum for dissemination to institutions and individuals locally, regionally, nationally, and internationally. This goal will be addressed through the following objectives: (1) Conduct a needs assessment; (2) Adapt course content to a multimedia format; and (3) Implement and evaluate the courseware. The proposed curriculum consisting of three courses, Introduction to the Integrated Poultry Industry, Poultry Production, and Avian Biology, will be available to a consortium of 2-year institutions offering agricultural programs. In addition, the curriculum will be available to high schools, Community Colleges, and private companies for the development of specialized poultry short-courses, or as a technical resource. This project will serve as a model for future agriculture programs within the Dale Bumpers College of Agriculture, Food and Life Sciences and will benefit the University of Arkansas as a whole through enhanced student retention and recruiting efforts.

Grant Number: 98-38411-6689
Project Director: George Wardlow

Lead Institution: University of Arkansas
Duration: 2 Years Award Amount \$160,000

Title: Faculty Teaching Support Center to Improve Undergraduate Instruction: Using the Constructivist Model of Teaching and Learning. This project seeks to establish a faculty teaching support center to improve undergraduate instruction in the agricultural sciences and technologies. The goal is to graduate students who are better prepared to apply technical knowledge and scientific principles to real-world problems. The center will provide comprehensive support in the improvement of teaching for regular on-campus courses, computer-based courses and modules, and distance education courses. In addition to "walk-in" support services for faculty, it will offer workshops, short-courses, and individualized assistance to faculty members toward transitioning their courses to the constructivist model of teaching and learning. This project will establish, equip, and staff a teaching support center. College instructors will use this center as a laboratory to plan and develop instructional materials under the assistance of faculty and staff who are trained as educators. Regular workshops will be offered to all faculty in the College with attendance strongly supported by the Dean as an expectation concurrent with a teaching assignment. Some workshops will focus on general instructional improvement strategies, and some will focus on transitioning courses toward teaching at the higher levels of learning. In the first year of the project, one course will be revised to the constructivist model of learning. This course will serve as a model for use by other faculty in converting their courses. In the second year, a second course will have been converted to the constructivist model at the lead institution and one course will be revised at each of the collaborating institutions. Additionally, instructional development workshop series will begin at the collaborating institutions. The third year will focus on the replication and evaluation of project activities, and on dissemination of findings. This project will provide instructors with the tools to teach their courses at the higher levels of learning, including application, synthesis, and evaluation, in order to enhance the abilities of our graduates to address problems of practice in their fields. Tangible results will include development of a teaching support center and documentation of the instructional model. This will include example courses and activities and student data on learning improvement and learner satisfaction. The results of this project will be made available through the development of a research monograph, as well as the traditional avenues for curriculum research and development within the higher education profession, including submission of journal articles and publications, and the development of an Internet web site.

Grant Number: 98-38411-6724
Project Director: Dianne Dickerson

Lead Institution: California State University-Fresno
Duration: 2 Years Award Amount \$78,288

Title: The expansion of an Agricultural Clinic Program from Pilot Project to Full Scale

Implementation. A Clinic Program involves student teams, under faculty supervision, working on problems identified and funded by a business, agency, farm, or other outside client. The students receive academic credit for their work, and the funds supplied by the project sponsor cover assigned time for the faculty advisor, program operation and incidental expenses for the project. Each project team consists of 4-6 student team members, a faculty advisor, and a client liaison. The objectives of this grant project are to 1) expand the Clinic Program in the School of Agricultural Sciences and Technology across the University, 2) complete at least twenty financially supported clinic projects, 3) to become self-sufficient, 4) to refine, validate and develop a more comprehensive assessment component, and 5) to disseminate information reviewing our clinic experiences through a web site and a conference. The expansion of the Clinic Program across the university will enhance the educational benefits for students and assist with reaching the goal of self-sufficiency. Multi-disciplinary projects will better prepare students to solve complex problems facing the agriculture community in contemporary society. The Clinic Program can only be improved through better assessment techniques, and the suitability of the Clinic Program as an assessment of learning outcomes needs to be investigated. Information and materials developed for the clinic Program will be made available on the web site. A conference will be held at the end of the grant period to disseminate information on the development and operation of a Clinic Program.

Grant Number: 98-38411-6567
Project Director: Cynthia Heiss

Lead Institution: California State University, Fresno
Duration: 2 Years Award Amount \$159,917

Title: A Computerized Autotutorial to Facilitate Critical thinking skills for evaluating Nutrition

Information. The purpose of this project is to develop and assess a computer multimedia autotutorial module designed to assist undergraduate students in the development of critical thinking skills so that they can better interpret or evaluate nutrition research and information. Nutrition is a field that is full of conflicting information. By training nutrition students to critically evaluate nutrition information, flawed interpretation resulting in misinformation to the public will be minimized. An interactive computer multimedia learning module will be developed using several multimedia software programs that will facilitate appropriate evaluation of nutrition information. Information frames, video clips, illustrations, and animations will be used in the autotutorial to present information and concepts. In addition, students will be required to answer questions and solve problems throughout the tutorial. Students will learn how to interpret data presented in tabular form, evaluate methods and statistical tests, and identify limitations of studies. Students will develop the ability to look at all sides of an issue. This project will include three objectives: 1) to enhance the multimedia capacity of California Polytechnic State University and University of Idaho Colleges of Agriculture by building a foundation of expertise among faculty in the use of computer multimedia; 2) to enhance the ability for faculty to foster critical thinking skills among students; 3) to develop and evaluate a computer autotutorial for the development of critical thinking skills regarding the evaluation of nutrition information. This project will benefit not only nutrition students, but also the public in general. The autotutorial will be disseminated via the world wide web as well as the American Dietetic Association Materials and Publication Department in CD format. The proposed project represents a collaborative effort among the Department of Food Science and Human Nutrition at California Polytechnic State University, the School of Family and Consumer Sciences at the University of Idaho, and the Department of Biology, United States Air Force Academy.

Grant Number: 98-38411-6623
Project Director: Buszko

Lead Institution: University of Florida
Duration: 2 Years Award Amount \$76,000

Title: Magnetic Resonance (NMR) for Use in Biological, Food, and Agricultural Sciences Curricula.

Magnetic resonance, NMR, is a powerful analytical tool for use in biological, food, and agricultural sciences. It is known to provide structural and imaging (MRI) information, and can reveal dynamics of molecules and biological processes *in vivo* with a level of detail that is unmatched by any other analytical tool. Use of NMR in undergraduate curricula, however, is limited - the primary reasons being the complexity of NMR instrumentation and operating procedures, the traditional single-user access, and the high cost of instrumentation. Recognizing the difficulties, a prototype Web-operated NMR spectrometer, the World-Wide Web NMR Spectrometer as it is called, has been developed at the Department of Microbiology and Cell Science at the University of Florida. The spectrometer, modeled after the World-Wide Web, allows for intuitive and multi-user operation. It will afford universal access to real, research-grade instrumentation for all students. The areas of project emphasis include microbiology, biotechnology, biological engineering, and, to a lesser extent, food science and technology. Students learn a variety of concepts, ranging from metabolism to molecular biology and genetics. The project proposes several representative experiments presenting the potential and uniqueness of the WWW NMR Spectrometer for real-time, multi-user *in vivo* NMR experiments for undergraduate education. A model of efficient use of the system is presented. The project involves partnership efforts and could have a potential impact on undergraduate education in biology, chemistry, physics, environmental, medical, and veterinary sciences.

Grant Number: 98-38411-6726
Project Director: Jonathan Crane

Lead Institution: University of Florida
Duration: 2 Years Project Award Amount \$80,000

Title: Web-Based Interactive Multimedia Instructional Tool For Tropical Fruit Crops.

The objective of this project is to design and implement a virtual field laboratory (VFL) for the World Wide Web (WWW) that will dynamically present information on plant growth, physiology and horticultural management of selected tropical fruit crops. This application will allow students in temperate and subtropical regions throughout the United States to virtually experience horticultural management and production of tropical fruit crops in the field. Mango and banana have been selected as the template models for this pilot project because there is a large body of botanical, physiological, and horticultural information for these two crops. Materials currently available only in static formats, such as textbooks and lectures, will be developed into a dynamic multimedia approach to illustrate phenology, physiology and horticultural management on the WWW. Botanical and crop production cycles will be presented in graphical and video formats and linked to relevant documents to provide a greater understanding of plant growth and production cycles. The preliminary application will be tested by undergraduate horticulture students in selected colleges and availability of the final application will be advertised to agricultural colleges world-wide. The proposed VFL will expand horticultural education and provide an opportunity for agricultural students to learn and experience tropical fruit production without the constraints imposed by an educational setting in a temperate region or limited course duration.

Grant Number: 98-38411-6727
Project Director: Joseph McHugh

Lead Institution: University of Georgia
Duration: 2 Years Award Amount \$79,736

Title: The Virtual Roach: An instructional tool for the study of insect anatomy. The Virtual Roach is an instructional CD-ROM package comprising a collection of graphics, text and a glossary terms. The interface for the system links the material in a dynamic manner permitting interactive study of the anatomy and natural history of the American Cockroach (Periplaneta americana (Linnaeus)). The anatomy section allows one to investigate the insect form in a virtual dissection using the American Roach as a model. Natural history information is conveyed using colorful photos, video clips and text to explore aspects of roach behavior, development, evolutionary history, and interactions with humans. Information on both subjects is extensively cross-linked throughout the program reflecting the inseparable nature of form and function. The Virtual Roach is highly adaptable to meet different instructional needs. As an autotutorial module, the program can function as a freestanding reference, an interactive benchtop guide, a pre-lab introduction, or a post-lab review tool. Because the extensive collection of colorful images and text are also available for quick reference from lists of direct links, the program can serve as powerful visual aid to augment lecture-format instruction as well.

Grant Number: 98-38411-6563
Project Director: Sara Anderson

Lead Institution: Southern Illinois University
Duration: 1.5 Years Award Amount \$79,433

Title: Partners for Dietetics Faculty Enhancement: The Computer Application Challenge. The purpose of this proposal is to strengthen the role of technology in undergraduate programs in food and nutrition by training nutrition and dietetics faculty members in computer productivity skills, and facilitating the integration of these skills into the curriculum of dozens of institutions across the country. Educators participating in this proposal will improve their computer skills and knowledge of software applications, increase the number of computer applications incorporated into their classroom activities, and develop classroom activities that fully integrate computer applications into dietetics education curriculum. Seven regional meetings of dietetic educators during Spring 1999 will feature a one day continuing education workshop of computer technology in higher education. The workshops will provide a foundation of computer experience for the participants to ensure a baseline knowledge base to use in classroom activities and to provide training on how computer technology can be used to enhance classroom activities and student learning. After the workshops, the Project Directors will establish a list serve and website to act as a clearinghouse for information about issues related to the use of computer technology and computer applications in dietetic education. Follow-up sessions will be planned for the national annual meeting attended by dietetic educators. Also at the national meeting, research symposia featuring successful techniques for computer applications in the classroom will be featured.

Grant Number: 98-38411-6612
Project Director: Michael Stitsworth

Lead Institution: Purdue University
Duration: 2 Years Project Award Amount \$79,977

Title: Enhancing the Capacity For Doing Business in Russia through Student Development. An urgent need exists to educate citizens in this country to global understandings and responsibilities. We live in a nation where one out of every three acres of farmland produces products for export, one out of six manufacturing jobs depends directly on foreign trade, and four out of five new manufacturing jobs result from foreign commerce. U.S. educational institutions that produce agriculture, food, and natural resources graduates have been criticized for their slow response to this new global economic reality. Opportunities for international study must be extended beyond humanities and social science students who are the most frequent beneficiaries of existing programs to include students of agriculture. As part of a university-wide internationalization plan, the Purdue University School of Agriculture has embraced the goal of developing programs that will permit 20 percent of agriculture students to spend at least two months abroad during their time at Purdue. To help meet this goal, Purdue is requesting funds to establish a program that will combine Russia-related course work on the campus with a nine-week academic program in Russia. Ten Purdue University undergraduate students with an interest in agriculture will study for nine weeks during summer 2000 at Novgorod State University, completing three courses (nine credits): *Russian Agribusiness in Transition*, *Developing and Implementing a Market Strategy for Russia*, and *Introduction to Business Russian*. As part of the market strategy course, each student will represent an actual Indiana "client" company for which they will collect and compile market data. In preparation for the academic program in Russia, students will complete three semesters of Russian language at Purdue and one other Russia-related course. The proposed program is intended to stimulate students to continue their study of Russian language, Russia-related courses, and other course work with an international focus. By producing agriculture graduates who have the capacity to understand not only the new global economic system, but also its varied cultures and languages, we believe this project will be effective in helping the U.S. strengthen its economy and compete effectively in the world marketplace.

Grant Number: 98-38411-6565
Project Director: Steven Jungst

Lead Institution: Iowa State University
Duration: 3 Years Award Amount \$73,235

Title: Preparing Faculty to Lead the Student-Centered Learning Revolution. Up to 40 faculty from the College of Agriculture at Iowa State University (ISU) and 10 faculty from the School of Agricultural and Environmental Science and the School of Education at Alabama A&M University will cooperate in a 33 month project to prepare faculty to facilitate student-centered learning. The project will provide faculty with the necessary skills to implement a teaching methodology which has been shown to improve higher level reasoning and analysis skills among students. It also improves students' understanding of material, makes them more effective members of problem-solving teams, and bolsters confidence in their ability to learn on their own. To help faculty make the shift to this teaching methodology, two 4-day workshops will be conducted on the ISU campus. An introductory workshop in January, 1999 will provide faculty with an understanding of the need for a change in teaching strategies. It will also begin to provide faculty with some of the teaching techniques necessary to facilitate student-centered learning. Following the introductory workshop, faculty will have an opportunity to practice the skills in their own class rooms for a summer before attending an advanced workshop to be held during the summer of 1999. The advanced workshop will help faculty delve deeper into the student-centered learning techniques as well as review some of the techniques learned and used in the previous workshop. Following the two 4-day workshops, faculty from the College of

Education at Iowa State University will facilitate bi-weekly learning group meetings for ISU participants in the program. They will also work with faculty on the Alabama A&M campus to develop the procedures necessary to implement learning group meetings there. Select faculty will be involved in facilitator training during the summer of 2000.

Grant Number: 98-38411-6725
Project Director: Deanna Munson

Lead Institution: Kansas State University
Duration: 2 Years Award Amount \$71,758

Title: A Model for Experiential Learning: Technology, Teams, and Community Education. The American Cancer Society's Heartland Division has made comprehensive school health a priority in its cancer prevention programming. To support this initiative, the Society developed the "Health for Success Mobile Classroom." The classroom design (which includes interactive computer stations, a surround-sound theater, and various computer kiosks) and curriculum was developed by a committee of educators, technologists, and physicians. The curriculum used in the mobile classroom needs regular updates, as well as continual refinement and expansion to meet the Society's health curriculum goals. The College of Human Ecology (CHE) proposes to team with the American Cancer Society's Heartland Division (ACSHD) to provide experiential learning for undergraduate students who will develop and implement educational programs and assess outcomes of the mobile classroom. This project will also allow the opportunity for faculty enhancement of teaching, as well as develop curricula that will be delivered via state-of-the-art computer technology. This project will involve faculty becoming familiar with the latest computer technology for curriculum development and delivery. The faculty will then facilitate top undergraduate students in CHE to develop a comprehensive health curriculum to be used in the American Cancer Society's mobile classroom. Students will work during the academic year to develop and refine curriculum, as well as help with training of other persons who will use the curriculum. Also, students will receive summer stipends as they implement the educational programs across the state. During the second year of the project, the curriculum will be further developed and modified, especially for Internet delivery systems. Again, students will work over the summer months as interns, coordinating the activities of the mobile classroom as it travels throughout Kansas. The curricula materials developed will have a wide area of dissemination, including the mobile classroom itself development and distribution of materials through the Kansas Extension system, and ready access to the general public via the Internet.

Grant Number: 98-38411-6561
Project Director: Bryan Schurle

Lead Institution: Kansas State University
Duration: 3 Years Award Amount \$74,678

Title: Integration of Computer Applications Throughout the Agribusiness Curriculum. The objectives of this project are to: develop computer application materials relevant for many courses throughout the agribusiness and agricultural economics curricula; enhance faculty expertise in the application of computers to problems in agribusiness and agricultural economics; develop "problem" cases suitable for undergraduate students in agribusiness that utilize the computer capabilities for arriving at a decision; make the materials available to a wide range of programs through the development of modules and increase the linkage between agribusiness programs and agribusinesses. The following materials will be developed: instructional materials related to computer applications in numerous courses in agribusiness and agricultural economics; computerized audio and video modules illustrating use of computer techniques; case "problems" illustrating the use of computer techniques for providing information helping to arrive at a decision; a WWW page describing the project and the materials that are being developed and advertising the availability of the materials, the case studies, and computerized audio and video files. The cases and modules will be made

available to any department that requests them. The results of this project will be disseminated through several outlets. Symposia or papers will be prepared for the American Agricultural Economics Association, regional agricultural economics associations, and the National Association of Colleges and Teachers of Agriculture. In addition, Kansas State University will host the Kansas Association of Colleges and Teachers of Agriculture conference in 1999. Presentation of the modules and the approach being used will be possible at this conference.

Grant Number: 98-38411-6697
Project Director: Kimberly Williams

Lead Institution: Kansas State University
Duration: 2 Years Award Amount \$70,988

Developing a World-Class Nutrition Course: Strengthened Quality/Contained Costs. Plant nutrition is a diverse and dynamic subject which encompasses both nutritional physiology and soil/root medium fertility. Students require a more in-depth knowledge of plant nutrition than our current curriculums alone can provide to prepare them to manage fertilizer use in greenhouses, nurseries, forests, and agronomic fields and to cope with environmental concerns such as nutrient cycling and run-off. This proposal will develop course offerings via distance learning technology to multi-universities through a "high tech, high touch" approach. At each university receiving this course, one or more plant nutrition experts will participate in course instruction by presenting information in their area of expertise and by leading local discussions. The objectives of the effort are to 1) strengthen course quality by increasing student access to experts in the field; 2) stretch faculty resources; 3) capitalize on and combine scientific expertise in a very diverse field; 4) create a 'comfortable' global environment for Midwestern students; 5) promote active learning and communication skills through written interaction with experts; and 6) promote collaboration, not duplication of courses. With proper coordination, participation, and funding, we propose to create, provide, and test a *working* model course in *Plant Nutrition and Nutrient Management* which meets these objectives. Initially, two universities will be involved: University of Nebraska-Lincoln (UNL) and Kansas State University (KSU), each with at least one faculty member with differing expertise in plant nutrition coordinating the effort and participating in instruction from their site. In addition, plant nutrition experts from other countries such as Puerto Rico will interact with students via electronic discussion lists.

Grant Number: 98-38411-6564
Project Director: Teresa Summers

Lead Institution: Louisiana State University
Duration: 3 Years Award Amount \$159,983

Title: Resources Supporting Fiber, Textile, and Apparel Curricula Evolution.

The purpose of this project is to expand the offerings on the dedicated server to provide comparative program data, complementary to that provided by FAEIS, that could be used in assessment and productivity measures of fiber, textile, apparel programs and to facilitate access to instructional materials that incorporate recent advances in discipline-specific subject matter. The website will contain three databases: Textile and Apparel Program Productivity and Quality Index (TAPPQI) - information about productivity and quality of fiber, textile, apparel programs for use in program assessment and curricula evolution; Media Resource Directory - annotated listing of resources reviewed by faculty; master teacher syllabi for selected content areas will also be available; and Materials Innovation Database - repository of information on recent advances in fiber, textiles, and apparel subject matter and research suitable for incorporation into classroom materials and/or course content beginning with information on finished alligator and ratite (ostrich/emu) skins and products.

Grant Number: 98-38411-6618
Project Director: Robert Rice

Lead Institution: University of Maine
Duration: 3 Years Award Amount \$68,009

Title: Pulp and Paper Marketing and Managing. The Pulp and Paper industry is the eighth largest industry in the United States and the largest segment of the Forest Products industry. While the technical aspects of pulp and paper manufacture are taught at both the graduate and undergraduate levels by a number of institutions in the US, there are no curricula that specifically address management and marketing issues. The project will synthesize material from several disciplines and integrate various approaches to develop pedagogic materials and a curriculum concentration in the area of Pulp and Paper Marketing and Management. The program will serve undergraduates entering from several base curricula. The plan of work also includes Internet-based courses that will allow practitioners and others who do not have access to on-campus training to matriculate through the curriculum or to learn the specialized course material. First, a book will be developed that will cover the structure of the pulp and paper industry as well as markets and marketing in the pulp and paper industry. Next, two specialized courses will be developed that will form the basis for the undergraduate curriculum concentration in Pulp and Paper Marketing and Management. Finally, to assist with dissemination beyond the local level an Internet based instructional program, suitable for undergraduates and practitioners, will be prepared based on the book and course content.

Grant Number: 98-38411-6611
Project Director: Geoffrey Dahl

Lead Institution: University of Maryland
Duration: 2 Years Award Amount \$79,811

Title: Enhancement of Experiential Learning in Animal Science. Numbers of animal science undergraduates continue to grow within our region, with over 90% of these students preparing for application to veterinary school. However, only 15-20% are actually successful in pursuit of entry to veterinary school. Thus, a large number of students are left to find alternative career paths. Our approach to increasing student knowledge of alternative careers in animal science is one of exposure and experience. First, students will be exposed to alternative careers by participation in a Regional Career Seminar. Second, students will experience alternative careers during the undergraduate program by participation in internships that result from interactions with stakeholders and the Seminar series. The plan of operation includes development of the career seminar course and establishing a website for posting internships available within the region. A variety of stakeholder participants will be recruited to make presentations in the career seminar course. Internship placement will also be sought from these stakeholders. Delivery of the seminar course will be via interactive video conferencing. Thus, efficiency of stakeholder recruiting efforts will be maximized while maintaining student-stakeholder interaction. The course will also include emphasis on resume writing and interview skills development. A website will be developed as a clearing-house for internships in animal agriculture within the region, and the access to the site will be emphasized in the career seminar course. Changes in student participation rate in internships will be evaluated as well as student and stakeholder satisfaction with the course and internships.

Additionally, stakeholders will provide input on the preparedness of animal science students for jobs within their industries and asked for feedback regarding curriculum changes needed to better prepare students.

Grant Number: 98-38411-6696
Project Director: Stephen Boyd

Lead Institution: Michigan State University
Duration: 2 Years Award Amount \$152,800

Title: Teaching Environmental Soil Chemistry to Undergraduates. The objective of this proposal is to develop an undergraduate (junior level) course in Environmental Soil Chemistry. The proposed course would consist of the following components: (1) lecture material to present basic soil chemistry within the context of three major classes of soil contaminants, viz. nutrients, metals and organics; (2) a series of seven wet laboratory modules to develop soil chemistry laboratory skills and reinforce soil chemistry concepts presented in lecture format; (3) a series of five computer-based modules to augment learning of basic soil chemistry concepts, inorganic soil components and environmental fate models for predicting metal speciation in soil solution and nitrate and pesticide leaching; (4) a series of at least five decision-based environmental case studies which integrate soil chemistry concepts by utilizing them for problem solving; and (5) a guide to facilitate utilization and optimization of Internet conferencing to build alliances with other universities and departments in teaching to enhance learning in environmental soil chemistry. A six member faculty team from Michigan State University, Purdue University, and University of Wisconsin-Madison has been assembled to develop the proposed course. The end products of this proposed project are: (1) the course itself as a part of the permanent curriculum at Michigan State, Purdue and Wisconsin; (2) lecture note-packs available to students and other potential instructors; (3) written case-studies and directions for their use in other environmental soil chemistry courses; (4) a laboratory manual detailing each laboratory and computer module; and (5) guide on implementation of the course, and the utilization and optimization of Internet conferencing to enhance learning in environmental soil chemistry. At the completion of the project an overall description of the course will be published in the Journal of Natural Resource and Life Science Education. Taken together, these end-products should promote easy adaptation of this course at other institutions and locales.

Grant Number: 98-38411-6614
Project Director: Carol Sawyer

Lead Institution: Michigan State University
Duration: 2 Years Award Amount \$142,045

Title: Critical Food Safety Issues in the International Retail Food Market. The objective of this multi-university collaborative project is to team-teach a web-based food safety course to senior level food science and dietetic undergraduate majors. Content issues will be identified by the teaching team and by a survey to 500+ retail food marketing professionals. This course will raise the level of scholastic achievement of US food science and dietetics undergraduates by focusing on emerging international food safety issues identified by the teaching team and a market survey of retail food professionals. Ease of access for handicapper, low income and mid-life career change students is facilitated by this MSU Virtual Network course based on: food microbiology, veterinary science, Internet access, international food law, and retail food marketing. The collaborative teaching efforts of four universities will improve their cost efficiency while also enhancing the cost: benefit to students. The approach ensures that food science and dietetic BS graduates will have used and understood the advantages of web-based technology in gaining immediate food safety knowledge. The course will be test taught Fall 1999 to 10 qualified students who passed at the 3.0+/4.0 level a food microbiology course within the past two years or the equivalent, have had web-site experience or a course, and who are registered at MSU as a senior food science or dietetics major. During Spring Semester 2000, the course will be opened to students at the University of Arkansas, University of California-Long Beach and Penn State University. Course evaluation will be based on: content currency and comprehensiveness, web site accuracy, relevant hyperlinks, and style and functionality of Internet sites, accessibility, technical support, level of interaction with the instructional team, and the student's level of learning and enjoyment during the course. When published, the results of the food safety surveys and of course evaluations will strengthen higher education and the agricultural sciences in

the United States while possibly improving the future health of the Nation and world community.

Grant Number : 98-38411-6622
Project director: Edward Nater

Lead Institution: University of Minnesota
Duration: 2 Years Award Amount: \$159,963

Title: Interactive 3-D Visualization of Molecules and Minerals in Soil Science Instruction. The function of soil components - both organic and inorganic - is largely determined by their 3-dimensional structure. Structural and functional concepts are introduced to students in introductory soil science courses, and are reinforced and expanded in other soil science courses (chemistry, fertility, plant nutrition, pedology, physics, and clay mineralogy) taught in nearly all 1862 and 1890 Land Grant universities and colleges of agriculture and required or taken by undergraduate and graduate students in soil science, horticulture, agronomy, and other majors. Student understanding of 3-D spatial structural concepts has been greatly hampered by the inherent nature and quality of instructional aids currently used in the classroom, consisting mainly of 2-D illustrations and physical models. Many students have great difficulties translating flat 2-D, non-perspective drawings of chemical and mineral structures into the 3-D realities they represent. Recently available computer software and world wide web browser plug-ins are capable of rendering molecular models (consisting largely of xyz coordinates of atoms and a connectivity table) into 2-D images with highlights, shadows, and perspective to simulate 3 dimensions. These models can be interactively zoomed and rotated, and can be viewed from any angle, much as can be done with a 3-D model. Such software is equivalent to monocular viewing of a 3-D object and is occasionally referred to as 2 1/2-D; herein, such renderings will be termed 3-d visualizations. Interactive features allow users to highlight various structural sub-units and change the views from space-fill to ball-and-stick to stick projections. Additionally, the visualizations can be constructed, updated, and altered in a relatively short period of time; are platform-independent (PC, Mac, and SGI are available); can be delivered worldwide from an Internet server, and can be animated to show atomic vibrations and reactions. We propose to develop research-grade 3-D visualizations of molecules and minerals important in soil science as instructional aids for soil science education. These 3-D visualizations will be incorporated into HTML (world wide web) molecules that combine text, questions, highlighting features, and other appropriate instructional materials. They will be offered for free via the Internet, or as a companion CD available for nominal cost. Projected instructional uses include: use in lecture/discussion sessions via computer projection systems, linking the modules to their own course web pages; as part of directed instruction in computer labs; and independent use in computer labs or at home. These materials will augment introductory and higher-level soil science textbooks without being specific to any particular text or edition.

Grant Number: 98-38411-6562
Project Director: Duane Ford

Lead Institution: Southeast Missouri State University
Duration: 3 Years Award Amount \$14,520

Title: Linking the Teaching of Production Agriculture with Liberal Education. This proposal involves the revision of a production-oriented agriculture major with a tripartite focus (1) to add sufficient science and mathematics to meet the certification standards of ARCPACS, (2) to incorporate nine pedagogical objectives for lifelong learning, and (3) develop a sustainable system of student assessment for each course involving key individuals from the farming and agri-business sectors. Thirteen courses have been selected for upgrade. The faculty will select key individuals to assist them in the redesign of the curriculum, focusing on modern technologies and skills necessary to master these technologies. The faculty will also select key individuals who will assist in "credentialing" the mastery of these skills through assessment of student learning. This project will strengthen the agricultural sectors of Southeast Missouri by graduating students who directly benefit from an up-to-date curriculum and the close interaction with key members from the agricultural sector. The faculty

believe that adoption of these curricular reforms may be important to curricula revitalization at other colleges and universities. The faculty plans to collectively publish the effectiveness of this approach in two leading journals in the discipline of agricultural education.

Grant Number: 98-38411-6566

Lead Institution: Rutgers University

Project Director: Thomas Gianfagna

Duration: 2 years

Award amount \$159,316

Title: Food Agricultural and Environmental Sciences Internship and Field Course Project. An essential aspect of the training of future food, agricultural, and environmental scientists is to provide laboratory and field experiences in both tropical and temperate regions, so that the student will be able to understand and propose solutions for societal, agricultural, food and environmental problems. In this project 3 different institutions share human and physical resources to produce 2 field courses with instructional manuals, and an internship program that will offer their students an educational experience that could not have occurred without collaboration. For students in most North American universities, the problems of the people of the tropical world are abstract and difficult to grasp. Knowledge and understanding are superficial and the potential for creative contributions limited. The challenge for us is to provide the student with the practical experience so that they may become knowledgeable analytical persons able to function on a "world-wide" basis. We believe that it is only through experiential learning that we will be able to train competent food, agricultural and environmental scientists and practitioners for the future. Our project begins by providing U.S. students with a field course in Puerto Rico so that they can experience for themselves and truly become knowledgeable about the food, agriculture and environment of a tropical country. We will follow with an internship in Puerto Rico, in which they can work with scientists who are developing new knowledge and solutions to practical problems. For University of Puerto Rico (UPR) students, they must be given the opportunity to observe, experience and learn how scientists in the temperate zone are solving the food, agricultural, and environmental problems in that part of the world. Students from UPR receive limited hands-on training in the use of modern scientific equipment in laboratory and field research. We will begin by providing them with a field course in New Jersey so that they can experience for themselves and truly become knowledgeable about the food, agriculture and environment of the temperate zone. We will follow with an internship program at Rutgers, so that they may obtain technical research training and have the opportunity to see how these tools are being used to solve problems in the temperate zone. Students from UPR have the unique opportunity to broaden their problem solving skills by combining their knowledge of tropical systems with new ideas or approaches learned in the temperate zone. In this way, students from 3 institutions can move into the less-developed tropical regions of the world and provide expertise in food production and environmental protection.

Grant Number: 98-38411-6621

Lead Institution: Rutgers University

Project Director: Barbara Zilinskas

Duration: 3 Years

Award Amount \$75,671

Title: Curriculum Development and Undergraduate Research Experience In Biotechnology.

The field of biotechnology has emerged as a major contributor to the advancement of agriculture, medicine and environmental sciences. At Rutgers University, a Bachelor of Science Degree program in biotechnology was established in 1989. Centered on the Cook College Campus, the curriculum emphasizes agricultural biotechnology. The program is very successful, recognized with National and University awards for excellence, and presently one hundred undergraduates are enrolled in the major. This proposal builds upon a major strength of the existing program, i.e., learning by doing, by enhancing undergraduate research opportunities for our students. This type of experiential learning has proven to be not only an excellent way to teach students both the technology and the process of scientific inquiry, but it also is perhaps the most valuable component of their undergraduate education in preparation for advanced study and positions in biotechnology.

industry. In addition, we propose to develop three new courses which are designed to educate the workforce of the twenty-first century. These include: Process Biotechnology, Nucleotide Sequence Analysis, and Microbial Diversity and Ecology. These three courses will be developed in the first year of this project, offered on a pilot scale in the subsequent year, and refined in the third year.

Grant Number: 98-38411-6624
Project Director: Cynda Clary

Lead Institution: New Mexico State University
Duration: 2 Years Award Amount \$80,000

Title: Multiple Media Techniques for Geographically-Isolated & Minority Students. Providing quality university classes in agricultural and food sciences is not enough to ensure a continual flow of young geographically-isolated and minority professionals into the nation's agricultural and scientific workforce. It is vital that these students also be equipped with the technology skills and experiential learning opportunities that will allow them to confidently interact with agencies and corporations well into the next millennium. This project will develop a course model and provide hands-on-learning using computer and video technologies to present students and their ideas to agricultural organizations. The real world situation of obtaining internships and apprenticeships with national corporations will be used as motivation for student participation. Students will form collaborative groups with professors and in-house multimedia professionals to develop frameworks, techniques, dissemination tools. The method will include: 1) Surveying targeted corporations; 2) Developing curricular materials and learning activities to support student computer and video tools; 3) Pilot testing the model; 4) Teaching a model course and providing learning activities to support outreach efforts of geographically isolated student to gain internships opportunities with distant organizations; 5) Conducting formative and summative evaluation; and 6) Distributing the model materials to other institutions and integrating these techniques into courses of study in agricultural and food sciences. It will model integration of electronic and distance technologies into student life, and will help ensure a continual flow of well-educated agricultural students into the workforce by aiding in securing internship in national corporations and organizations.

Grant Number: 98-38411-6576
Project Director: Charles McClintock

Lead Institution: Cornell University
Duration: 2 Years Award Amount \$79,860

Title: Expert Knowledge: Linking Classroom and Experiential Learning. The proposed project is a collaborative effort between Cornell's College of Veterinary Medicine and College of Human Ecology. The project will (1) characterize the nature of professional expertise in relation to selected core course content in each college to better articulate the linkages between experiential and classroom learning, and (2) develop and evaluate tools for assessing knowledge gains through experiential learning for both undergraduate and graduate students. The rising costs of higher education and desire to strengthen campus-community connections have increased the exploration of potential partnerships between universities and practitioners on a larger scale. If field study is to have an academic status comparable to traditional classroom education, it will be necessary to specify the knowledge that is to be gained from this mode of education, and to give faculty the tools to assess students' learning of that knowledge. Increased understanding of professional expertise, its linkages to classroom concepts, and how to rigorously assess student learning will benefit many educational programs of varying scope within the agricultural and food sciences. Based upon interviews with 100 professionals and ongoing consultation with a core group of faculty, field mentor and student cooperators, this project will characterize their expert knowledge and suggest ways that related experiential learning may be most effectively integrated with classroom learning. Focusing specifically on the diverse fields of veterinary medicine, and nonprofit management and public policy analysis in family/consumer sciences, the project will

devise means of testing student learning of these integrated experiential and classroom domains. Results will be evaluated in comparison to typically less structured methods of assessing learning through field study, and disseminated through a web page, conference presentations, and publications in relevant professional journals.

Grant Number: 98-38411-6574
Project Director: Pascal Oltenacu

Lead Institution: Cornell University
Duration: 2 Years Award Amount \$64,833

Title: Model to Increase Interaction and Effectiveness of Distance Learning in Genetics. The goal of this project is to create a highly interactive distance learning environment using computer technology and student support systems, and to evaluate the effectiveness of these inputs. The primary objectives of the project are to (1) use computer technology to develop and deliver highly interactive animal genetics curriculum to partnering institutions; (2) design and implement a model distance education program that strives for maximum interaction through collaborative learning between students and instructors, students and students, and students and the content; (3) evaluate the model program for learning effectiveness and ease of interaction. In year one of the project faculty from Cornell University, with inputs from receiving institutions, will design and develop the computer labs and the computer assisted instructional program (CAIP) used in residence instruction at Cornell for distance learning, and deliver a genetics course and supporting labs to receiving sites. A communications expert will design a systematic desensitization and skills training model program that will be delivered and evaluated. Data will be collected for research and evaluation analysis and adjustments will be made to the program. In year two of the project a second treatment will be administered to the fall 1999 class of students participating in the genetics curriculum, data will be collected and analyzed, and a final report filed. The benefits of this project are numerous. First, the entire curriculum in applied animal genetics at CU will ultimately be made available for use by any institution in the Northeast and, ultimately, in the US to complement their on-site courses. The modular structure of the curriculum and the support provided by CAIP would provide a rich educational experience for students of animal genetics. Second, the software and templates developed to facilitate interaction are easily transportable to other distance learning content areas. Third, the systematic desensitization and skills training programs will give students the skills necessary for their success in the distance learning environment.

Grant Number: 98-38411-6729
Project Director: Margie L. Gallagher

Lead Institution: East Carolina University
Duration: 2 years: Award amount: \$80,000

Title: On-Line Instructional Delivery System for a Professional Course in Human Environmental Sciences. The major objective of this proposal is to use electronic technology systems to deliver a capstone professional course which: 1) addresses abstract professional issues, such as ethics, 2) fosters good communication, 3) facilitates student collaboration and directed team work, 4) increases the technology literacy of faculty and students, and 5) encourages professional development by providing students with direct on line contact with other universities, agencies, institutes and professional organizations. This course will strengthen higher education in the food and agricultural sciences in the United States by providing a platform for students to discuss serious professional issues, come to appreciate the importance of good communications, and improve their computer literacy. We will disseminate the information about the course on the network and make it or any module of the course available to other institutions. In addition, we will communicate evaluation input from students, faculty, and other professionals through presentation at discipline conferences as well as teaching conferences.

Grant Number: 98-38411-6577
Project Director: Garee Earnest

Lead Institution: Ohio State University
Duration: 2.5 Years Award Amount \$79,617

Title: Developing Leadership Potential in Future Food and Agricultural Sciences Leaders.

Contemporary careers in food and agricultural sciences demand much more of college graduates than merely being subject matter experts in a focused discipline area . Today's employers not only demand technical expertise within a focused area but also broader interpersonal and organizational skills critical to successful business and industry. The College of Food, Agricultural, and Environmental Sciences and the OSU Extension Leadership Center are collaboratively proposing a two-year experiential leadership development program for 24 future food and agricultural sciences leaders who have demonstrated academic discipline excellence . This program will enable these promising students to bridge academic disciplines with current and emerging leadership issues in food and agricultural systems by working with identified academic and commodity leaders in their food and agricultural profession. The students will: (1) participate as a cohort in an advanced section of the current college leadership seminar, (2) participate in four experientially focused seminars linking leadership theory to contemporary issues within food and agricultural sciences, and (3) complete any innovation project by working with a faculty advisor and a commodity group mentor from their future agricultural profession. Program experiences will be based upon contemporary leadership theories and models. Individual and group activities and reflection will encourage peer teaching and learning. The four seminars will be as follows:

- . Seminar I: Developing a Personal Foundation for Transformational Leadership
- . Seminar II: Strengthening Diversity through Pluralism
- . Seminar III: Understanding Organizational Change
- . Seminar IV: Linking Individual Leadership to Organizational and Societal Change in the Global Community

Grant Number: 98-38411-6575
Project Director: Thomas Kuzmic

Lead Institution: Oklahoma State University
Duration: 1.5 Years Award Amount \$40,165

Title: Exploring Natural and Cultural Resources: An International Experiential Approach.

This project addresses the need and targets the opportunity of integrating an international perspective into the curriculum of undergraduates pursuing forestry and natural resource management at Oklahoma State University (OSU), and in enhancing the ability of faculty to develop timely academic materials, stimulating methodologies, and effective strategies for its delivery. It focuses on the development and delivery of an international travel course aimed at providing an experiential learning opportunity for undergraduate students and faculty at OSU interested in forestry and natural resource management at the international level. The course will integrate natural, cultural, political and economic elements in a nontraditional immersion format to stimulate creative exploration and to expand knowledge and awareness of the human relationship with the natural environment on a global scale. Student participants will work with faculty mentors in developing academic contracts for their course experiences that identify individualized objectives and a format for distinct creative components. The course will include twelve days of international travel and immersion. Linkages between natural resources and cultural resources in other countries will be examined and compared with the American experience.

Grant Number: 98-38411-6802
Project Director: Shiretta Ownbey

Lead Institution: Oklahoma State University
Duration: 3 Years Award Amount \$78,772

Development of Apparel & Textiles *Virtual Career Fair* for Experiential Learning. The purpose of this project is to develop a *Virtual Career Fair* website to facilitate experiential learning in an apparel and textiles internship program. Internships have become an integral part of higher education curriculum, offering benefits to students, employers, and universities. Internships allow exposure to techniques, opportunities, and equipment not available in the classroom. Internships also increase self-confidence and help clarify career goals. This project is designed to enhance experiential learning by linking interns with professionals representing unique and varying aspects of the apparel and textiles industries. A primary focus will be instructing interns to research career options using technology, experience different segments of the industry, and view the internship process as serious preparation for future careers. The plan of operation will involve conducting videotaped interviews with successful apparel and textiles professionals and developing a website that simulates a career fair. Interviews will focus on each professional's career path, current job responsibilities, past internship experience(s), and career recommendations. The *Virtual Career Fair* will be comprised of various "tents" labeled with different apparel and textiles industry segments (e.g., children's wear, intimate apparel, men's wear) which will link with information on different careers (e.g., computer-aided designer, quality assurance director, merchandise manager, designer, buyer, visual merchandiser). Each labeled "tent" will link students with information about a practicing professional, his/her career paths, and recommendations for students. This website will be linked with a recently developed web-based Pre-Internship course to enhance experiential learning. Pre- and post-evaluation will be conducted to assess increase in knowledge of career options and use of the site as an experiential learning tool.

Grant Number: 98-38411-6695
Project Director: Lester Griel

Lead Institution: Pennsylvania State University
Duration: 3 Years Award Amount \$71,741

Title: Mechanisms of Disease - A Freshman Seminar. This proposal describes the development and implementation of a new course, *Mechanisms of Disease*, which is designed primarily for entering freshmen or undeclared students transferring into the College of Agricultural Sciences. The new course emphasizes experiential and collaborative learning, addressing several well recognized educational goals. These include: 1) to introduce students through case-based learning to the process of scientific discovery at an early stage in their college education; 2) to introduce important issues in the animal biosciences early in the curriculum; 3) to facilitate the students' self-discovery of the relevance of the basic sciences (e.g., chemistry, mathematics) to understanding "practical" problems in animal biosciences; 4) to introduce students to the university's breadth of learning resources and educational opportunities; 5) to foster collaborative learning as a skill that will continue to serve students in their collegiate and post-graduate years. The new course, to be developed by nine faculty in the Department of Veterinary Science and Department of Agricultural Economics, will consist of three modules with emphases on Animal Production and Health; Cellular and Molecular Mechanisms of Disease; and Environmental Impact on Health. Experiences will include in-class discussions; on-site visits to animal production and diagnostic facilities; computer and website-based instruction and exploration; and assignments designed to build writing and speaking skills. Individual and interactive learning will be evaluated. The course will provide instruction at a basic level designed to maintain the enthusiasm of freshmen in the biological sciences related to animal and human health.

Grant Number: 98-38411-6620
Project Director: Joseph Irudayaraj

Lead Institution: Pennsylvania State University
Duration: 2 Years Award Amount \$80,000

Title: Bringing Biosensor Research to the Classroom Through Internet and Multimedia. The objective of this multi-disciplinary effort is to bring together a team of researchers from different disciplines to develop a one-semester web-based course in the key and emerging area of biosensors with a major emphasis in foods research and application. Biosensors are becoming currently a key research area and a major force in the job market with an estimated market potential of \$1,480 million by the year 2004. No effort is being undertaken to prepare our students for the challenge. We will address the principles, applications, and issues of sensing and biosensors in food and related products with reference to process monitoring, quality, safety, and energy. The Internet based course will be accompanied by movie and slide shows of 14 laboratory experiments and text materials. The course materials will be developed based on extensive inputs from companies that are currently associated with the Center for Food Manufacturing (CFM) at Penn State. The course will be carefully researched, and instructional tools and materials will be developed into modules to provide the flexibility to either incorporate selected sections into an existing course or as a complete course. Approximately 10-12 stand-alone modules, with consistent educational objectives, will be developed. The modules will consist of material delivered through the WWW, including interactive graphics, and/or video productions with slide shows. The emphasis will be on using interactive tools to promote an active educational experience in learning state-of-the-art technology. The materials will be available to other universities free of charge. In return we will request that they develop a section in biosensors or applications and post it on the sensors web site.

Grant Number: 98-38411-6617
Project Director: Deborah Grossman-Garber

Lead Institution: University of Rhode Island
Duration: 2 Years Award Amount \$80,000

Project Title: Strengthening Experiential Learning in Vertically Integrated, Problem-Based Teams. This project will create a comprehensive, four-year program that integrates experiential learning in the area of natural resources, food, and agricultural sciences into a student's overall academic career. Freshman and sophomore students will be asked to prepare a formal application for the program. Once placed within a team setting, students will be asked to work with their team mentors and faculty advisors to prepare a learning contract. The contract will spell out the nature of the experience and the role of the student within the team. We will assemble an advisory committee to help guide the development of a student reflection and synthesis component. This group will help identify the actual training needs, standards, and benchmarks that students should demonstrate upon graduation. The research/extension team members will develop training materials and experiences within their programs for freshmen and sophomores. These experiential learning opportunities will evolve via extended interactions and dialogue, as the research/extension teams share their programs with the undergraduate directors and learn of their curriculum expectations. Undergraduates will be engaged in the identification of current applied problems within their Land Grant discipline. They will be required to define the scientific knowledge available to address applied problems and to review the range and scope of similar programs around the nation and the region. Problem-solving and communication skills will be honed as students participate in the implementation of solutions, technology transfer, and outreach education. Long-term interaction with students in problem-based settings will provide students the opportunity to tailor their educational careers to their occupational objectives.

Grant Number: 98-38411-6625
Project Director: Laurie Nichols

Lead Institution: South Dakota State University
Duration: 3 Years Award Amount \$79,500

Title: Faculty and Students: Learning Together Across Cultures. Despite the noble efforts of many collaborative diversity initiatives, racial insensitivity is still commonplace among students and faculty at land grant institutions across the country. In South Dakota (SD), this reality has unique, wide spread implications. American Indians comprise 7 percent of the state's population, and some 20 percent of the state's land is located on one of nine Indian reservations. Yet reservation counties in SD rank among the poorest in the country, and are home to high instances of unemployment, diabetes, drug addiction, and fetal alcohol syndrome. The need for more Native American professionals in the agricultural, biological, family and consumer sciences is clear. The need for both Indian and non-Indian students and faculty to develop skills in working cross culturally is equally apparent. This proposal follows up a "2 + 2 + 2" project which involved South Dakota State University, along with five of the state's tribal colleges and reservation high schools in a multidimensional collaborative effort to increase the number of American Indians earning baccalaureate degrees. Based on what was learned with this initial project, we now propose to: (1) design and implement a reciprocal faculty development program for the tribal colleges, reservation high schools, and SDSU; and (2) implement a series of collaborative learning opportunities for students at the reservation high schools, tribal colleges, and SDSU. Our expected outcomes include: faculty strengthened in their understanding of their discipline's connection to native cultures, curricula which is more actively inclusive of native cultures, a strengthened inter-institutional support network for Indian students expanded collaborative relationships between reservation high schools, the tribal colleges and SDSU. Longer term objectives are to decrease race-based tension between Indian and non-Indian students, and to increase the number of Native American graduates in the agricultural, biological, family and consumer sciences.

Grant Number: 98-38411-6699
Project Director: Albert Schultze

Lead Institution: University of Tennessee
Duration: 3 Years Award Amount \$157,041

Title: Teaching Clinical Pathology of Food and Fiber Producing Animals Via the World Wide Web and Interactive Video Teleconferences. This project will produce a collection of interactive, world wide web lessons and a continuing series of video teleconferences that will be used to teach clinical pathology of food and fiber producing animals to veterinary medical students and students in related animal sciences. The web pages will use a case-oriented approach for the presentation of the fundamental principles of clinical pathology to students in the professional curriculum. Students will be presented with actual cases that include examples of abnormal hematology, serum biochemistry, cytology, urinalysis and hemostasis data through use of web pages that incorporate animation, video, audio, computer generated text and digitized images. After the student has had an opportunity to develop a problem list and select appropriate tests for case investigation, laboratory test results will appear which will enable the student to develop a diagnostic plan and treatment regimen. Explanations of the pathophysiology of each test abnormality will follow. The instruction will be self-paced and the lessons will be designed so that the student must actively participate and make decisions that affect case outcome. In addition, beginning in the second year of the award, we will provide two video teleconferences annually that focus on the clinical pathology of food and fiber producing animals. During these conferences, teams of students from the University of Tennessee, Purdue University, and the University of Illinois will present case analyses to fellow students. We will also utilize the collective expertise of veterinary clinical pathologists and practitioners of food animal medicine and surgery at these three land grant institutions to provide state of the art discussions and to present recent applicable research results that will improve student understanding of the discipline.

Grant Number: 98-38411-6619
Project Director: Bhimanagouda Patil

Lead Institution: Texas A&M University-Kingsville
Duration: 3 Years Award Amount \$79,945

Title: Phytochemicals in Fruits and Vegetables to Improve Human Health. The overall goal of this program is to provide undergraduate training opportunities for students to acquire knowledge in various disciplines such as agriculture, food science, nutrition, biology, chemistry, medicine and toxicology which relates to the effect of fruits and vegetables on human health. Our focus is to make students aware of careers in health-related interdisciplinary fields as investigators, and increase their knowledge and understanding of the relationships between research findings and practical use of phytochemicals. The students of agriculture and food science from the Texas A&M University System campuses at College Station, Kingsville, Weslaco, and Corpus Christi and the University of Texas campuses at Edinburg, Brownsville, and Houston will participate in this course. Phytochemicals are ideal compounds to aid in the prevention of diseases. Educating undergraduate students about research to reduce risk factors through diet will result of reduction in chronic diseases, for example cancer, heart disease, and stroke. It is anticipated that this educational effort will substantially increase the number of students continuing their careers in interdisciplinary research.

Grant Number: 98-38411-6615
Project Director: Virginia Felstehausen

Lead Institution: Texas Tech University
Duration: 3 Years Award Amount \$160,000

Title: Assessment of Family and Consumer Sciences, Food and Nutrition National Standards. The instructional purpose of the proposed project is to strengthen the pre-service preparation of Family Consumer Sciences (FCS) teachers by integrating the 1998 FCS National Standards into undergraduate teacher education programs. The project will focus on preparing future (FCS) teachers to use the Standards as a basis for assessment of educational outcomes. The following objectives will be addressed: (1) Design an evaluation model appropriate for FCS subject matter areas and applicable to a variety of curricular frameworks. (2) Develop pedagogically sound assessment strategies for the FCS National Standards in the content area of food and nutrition. (3) Field test assessment strategies through undergraduate FCS teacher education programs. (4) Provide professional development on assessment of educational outcomes to teacher education faculty, cooperating teachers, and others involved in the pre-service preparation of FCS teachers. (5) Disseminate project products to identified FCSE target audiences, including state administrators, secondary teachers, and other professionals. The project will be implemented by the three participating institutions through collaborative efforts involving teacher educators in 16 states and other FCS professionals. To ensure sound pedagogy, the assessment model and strategies will be based on a review of literature and will be developed in consultation with a panel of experts. The strategies will reflect current innovations in assessment, including authentic or "real world" applications. Assessment strategies will be field tested in a variety of undergraduate teacher education programs. Project materials will be accessible to teacher educators at all institutions in every state. Professional development will be provided to FCS teacher education faculty and other FCS professionals at annual meetings of the American Vocational Association (AVA) and the American Association of Family and Consumer Sciences (AACCS). Undergraduate students will collaborate in the development and field testing phases of the project and also will be involved in professional development and dissemination activities. The products and results of the project will include an assessment model appropriate for all FCS subject areas included in the National Standards, and adaptable to a variety of curricular frameworks, pedagogically sound assessment strategies, and recommendations for infusion into undergraduate teacher education programs.

Grant Number: 98-38411-6754
Project Director: James McKenna

Lead Institution: Virginia Polytechnic Institute
Duration: 2 Years Award Amount \$159,000

Title: Develop an Undergraduate Curriculum in Environmental Science (ES) and Create Web Pages (of ES). The objective of this joint proposal from Virginia Polytechnic Institute and State University, (Virginia Tech - lead institution) and two 1890 institutions, Virginia State University (VSU), Virginia Union University (VUU) and Elizabeth City State University(ECSU) is to provide training to faculty members from VSU, VUU and ECSU in developing an undergraduate curriculum in environmental science (ES) and create web pages of ES. The interactive, Internet learning modules, based on uniquely successful environmental science courses developed by CSES educators since 1996, will be developed at the faculty workshops at Virginia Tech, during the first year of the project. The innovative component in this proposal is the development of a support system which will allow three 1890 institutions to attain and adopt a highly technical and realistic BS curriculum in ES. The workshops will enable faculty members from minority institutions to have access to a successful model and individual attention in developing courses according to their respective disciplines. Further, the follow-up workshops on the campuses of partner institutions, will facilitate the faculty to use the training at their work place. This support system will provide the infrastructure to integrate the teaching of ES courses with General Education (GE) courses horizontally. At the end the two-year project, the ES courses will be offered as four-credit or three-credit courses from freshmen year (100 level) and, it will continue to change to higher level courses (three or four-credit). The multimedia laboratories at Virginia Tech and at partner institutions will be used to train faculty to write the courses for the web. The close interactions among the ES educators will allow exchange of information on teaching strategies for undergraduates. The interactions among the participants will be continued by mail, fax, e-mail, and telephone. CSES has Internet classroom pages which contain both a chat-line and e-mail address. A list serve of participants will be formed to allow for rapid communication and exchange of ideas.

Grant Number: 98-38411-6572
Project Director: Dixie Reaves

Lead Institution: Virginia Polytechnic Institute
Duration: 3 Years Award Amount \$43,793

Title: Alternative Methods of Delivering Agricultural Economics Instruction. Introductory Agricultural Economics (AgEcon) courses at Virginia Tech are currently taught in a large lecture format. Students sometimes struggle with the abstract content of the course and could benefit from the use of computer-aided learning tools that help them to apply the theoretical concepts, while engaging them in more active learning. A specialized package of computer-aided tools will be refined, drawing from both published and non-published tools in use in introductory AgEcon courses throughout the United States. Once the package of computer-aided tools has been refined and tested in the traditional classroom, it will be adapted for use in a distance delivery system. The College of Agriculture and Life Sciences (CALS) at Virginia Tech has a substantial number of transfer students each year. Many of these students enter the program having already completed a set of social science courses that fulfill the university's core requirement. However, since the community college system does not offer agricultural or natural resource curricula, social science courses are not in the agricultural economics discipline. To best prepare students for upper level courses and, ultimately, for their careers in the food and fiber system, access to the AgEcon sequence is desirable. Distance delivery will achieve this goal.

In addition to the transfer student audience in the community college system, another client base that can benefit distance delivery of introductory AgEcon is the individuals who are interested in taking college courses, but who are in rural areas that are under served by the community college system.

Grant Number: 98-38411-6573
Project Director: Gregory Welbaum

Lead Institution: Virginia Polytechnic Institute
Duration: 2 Years Award Amount \$15,173

Title: Teaching Vegetable Crops on the Internet. This is a proposal developed at Virginia Tech to provide a computer-based teaching delivery system that would allow undergraduate students to access learning material from a comprehensive website. This two-year project will further develop an existing computer homepage for the undergraduate course *Vegetable Crops*, Horticulture 4764, at Virginia Tech, by providing comprehensive instructional material describing the principals of production, economic importance, quality characteristics, nutritional value, consumption trends, post harvest handling, and international trade of more than 20 of the most economically important vegetable crops grown in the U.S., information not currently available from a single website. This website is not designed to replace traditional lecture periods, but to facilitate learning by allowing students to review lecture material outside the classroom, communicate with other students and the instructor, take interactive practice examination and explore related websites of interest. The expanded homepage will enable students to address information on vegetable crops from campus computer laboratories as well as off-campus locations. The website provides timely information that can be accessed and utilized by students enrolled in similar courses at other colleges and universities as well. The class material will also be linked to the Virginia Tech Department of Horticulture Homepage to provide access to the general public. This teaching homepage can be accessed over the world wide web through the department of horticulture at Virginia Tech server. The effectiveness of the homepage as a teaching tool will be assessed by surveying students enrolled in the course.

Grant Number: 98-38411-6616
Project Director: Stephen Hines

Lead Institution: Washington State University
Duration: 3 Years Award Amount \$80,000

Title: Computer Based Program Serving as Bridge for Collaborative Learning In-Class and Out-of-Class Discussion. The goal of the project described here is to design, implement and assess a Web-based computer program that will serve as an "electronic bridge" between an out-of-class, collaborative learning exercise and an in-class discussion. The hypothesis that we propose to test is that students' use of the program will enrich and elevate classroom discussion. More explicitly, we expect that students' use of this case-based computer program will increase student contributions to verbal discussion, improve their ability to identify and explain key observations and disease mechanisms, keep discussion focused on important learning issues, and enhance students' abilities to accommodate new information. The proposed project is multidisciplinary in nature. As a primary learning objective, we want students to understand the relevance of basic science to applied or clinical science. Specifically, students should understand how gross and microscopic changes in an organ system (lesions) produce clinical signs, alterations in laboratory parameters, and abnormalities in imaging modalities such as radiographs. They should also appreciate how these basic concepts and the scientific method can be applied to solve clinical problems. Importantly, the computer program described here is not a "stand alone" autotutorial but will serve as the foundation for a learning exercise that emphasizes independent discovery, team work, problem solving, and communication skills. We believe that this project can serve as a model for the strategic application of technology to address specific learning objectives and/or solve defined learning problems. In particular, enhancing classroom discussion is a common goal of educators in the food and agricultural sciences.

Grant Number: 98-38411-6568
Project Director: Kirk Parkin

Lead Institution: University of Wisconsin-Madison
Duration: 3 Years Award Amount \$80,000

Title: Enhancing Food Chemistry Learning Via an Inquiry-based Pedagogy. The objective of this proposal is to design a Food Chemistry laboratory curriculum that recruits students as active learners of core food chemistry principles and concepts. A Food Chemistry instructional laboratory curriculum will be developed as a collection of modules, where each module focuses on exploring chemical properties of a specific, major food component. The central theme underpinning course activities will be to illustrate or establish trends or patterns (viz., concept-based) of food component chemical behavior, rather than the more traditional approach of gathering data or facts that serve to verify existing knowledge. Each module will consist of three parts: pre-lab, experimental, and post-lab phases. The pre-lab will involve an instructor-guided development of a working hypothesis or questions that is/are to be addressed during the ensuing experimental phase. The experimental phase will be designed to collect information and observations in a manner that tests the central hypothesis or question(s) and to allow for periodic group evaluation interspersed within the complete set of experimental activities. This latter feature will also present opportunities for open-ended inquiry-based activities on the part of the students. The post-lab will involve an instructor-facilitated discussion of what was learned or "discovered" in view of the initial hypothesis/question addressed. This post-lab discussion will be the basis for summarizing and bringing "closure" to the module; a discussion of what was learned (as well as what still needs to be learned) will be rely primarily on the students' own observations.

Grant Number: 98-38411-6788
Project Director: Michael Compton

Lead Institution: University of Wisconsin-Platteville
Duration: 3 Years Award Amount \$58,481

Title: Developing Ornamental Horticulture Curricula at UW-Platteville The primary goal of the proposed project is to increase enrollment of females, minorities and nontraditional students at the University of Wisconsin-Platteville. We have identified three objectives that we believe will aid in achieving this goal, including: 1) developing new courses in indoor plants and basic floral design; 2) developing an ornamental horticulture major; and 3) identifying and/or developing business courses directed toward the small business owner/manager. We have offered a 24 credit minor in horticulture for over 20 years. The horticulture minor has been one of the most popular minors offered within the School of Agriculture. However, it does not offer the depth of study found at other four-year institutions. This reduces its attractiveness to potential students. Lack of depth and experiential opportunities also places our students at a competitive disadvantage when competing for horticultural jobs following graduation. In order for us to offer a major in Ornamental Horticulture, it will be necessary for us to develop new courses, and evaluate existing courses to see how they can be modified to support the new program. We have identified key personnel in agriculture, biology and business and communications at UW Platteville to aid in evaluating existing courses and to develop new classes for the business emphasis. However, it will be necessary for us to work with members of the landscape and floriculture industry for the project to be successful. We expect that implementation of the new courses and ornamental horticulture program will increase enrollment of women, minorities and nontraditional students in agriculture programs at UW-Platteville, and result in students that are better trained in Ornamental Horticulture, especially in small business management.